## SEQUENCE LISTING

<110>	Malvar, Thomas Gilmer, Amy Jelen	
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Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile 50 55 60	
Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile 65 70 75 80	

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- Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu 115 120 125
- Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala 130 135 140
- Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val 145 150 155 160
- Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 175
- Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 180 185 190 .
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- Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 210 215 220
- Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 240
- Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro 245 250 255
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- Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285
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- Thr Ile Asp Pro Glu Arg Ile Thr Gln Ile Pro Leu Val Lys Ala His 465 470 475 480
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- Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655
- Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670
- His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685
- Phe Lys Gly Ile Asn Arg Gln Leu Asp Arg Gly Trp Arg Gly Ser Thr

690 695 700

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1005

1000

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								tct Ser		672
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			tat Tyr									1104
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		gat Asp								1968
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	-	-		aaa Lys			-			-				-	2256
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				caa Gln											2592
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		g tca caa gaa gtt l Ser Gln Glu Val 1020	_
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Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile 50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile 70 75 80

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- Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser 580 585 590
- Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr
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- Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser 645 650 655
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- His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn 675 680 685
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1005

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- Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285
- Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300
- Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315
- Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335
- Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350
- Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365
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- Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln 405 410 415
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- Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445
- Arg Ala Pro Met Phe Ser Trp Thr His Arg Ser Ala Thr Pro Thr Asn 450 455 460
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Arg 545	Ile	Phe	Ala	Gly	Gln 550	Phe	Asn	Lys	Thr	Met 555	Asp	Thr	Gly	Asp	Pro 560
Leu	Thr	Phe	Gln	Ser 565	Phe	Ser	Tyr	Ala	Thr 570	Ile	Asn	Thr	Ala	Phe 575	Thi
Phe	Pro	Met	Ser 580	Gln	Ser	Ser	Phe	Thr 585	Val	Gly	Ala	Asp	Thr 590	Phe	Sei
Ser	Gly	Asn 595	Glu	Val	Tyr	Ile	Asp 600	Arg	Phe	Glu	Leu	Ile 605	Pro	Val	Thi
Ala	Thr 610	Phe	Glu	Ala	Glu	Tyr 615	Asp	Leu	Glu	Arg	Ala 620	Gln	Lys	Ala	Va:
Asn 625	Ala	Leu	Phe	Thr	Ser 630	Ile	Asn	Gln	Ile	Gly 635	Ile	Lys	Thr	Asp	Va 640
Thr	Asp	Tyr	His	Ile 645	Asp	Gln	Val	Ser	Asn 650	Leu	Val	Asp	Cys	Leu 655	Sea
Asp	Glu	Phe	Cys 660	Leu	Asp	Glu	Lys	Arg 665	Glu	Leu	Ser	Glu	Lys 670	Val	Lys
His	Ala	Lys 675	Arg	Leu	Ser	Asp	Glu 680	Arg	Asn	Leu	Leu	Gln 685	Asp	Pro	Ası
Phe	Lys 690	Gly	Ile	Asn	Arg	Gln 695	Leu	Asp	Arg	Gly	Trp 700	Arg	Gly	Ser	Thi
Asp 705	Ile	Thr	Ile	Gln	Arg 710	Gly	Asp	Asp	Val	Phe 715	Lys	Glu	Asn	Tyr	Va] 720
Thr	Leu	Pro	Gly	Thr 725	Phe	Asp	Glu	Суѕ	Tyr 730	Pro	Thr	Tyr	Leu	Tyr 735	Glr
Lys	Ile	Asp	Glu 740	Ser	Lys	Leu	Lys	Ala 745	Phe	Thr	Arg	Tyr	Gln 750	Leu	Arg
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- Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys 865 870 . 875 880
- Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu 885 890 895
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- Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu 995 1000 1005
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att tct aga tta gaa gga cta agc aat ctt tat caa att tac gca gaa 336 Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu 100 105 110
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	_		_	-		tta Leu				_	_	-	_	_		528
						gga Gly			_					-	_	576
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_				-		tta Leu 215	_	-	-			_	_		_	672
						caa Gln										720
						ttc Phe										768
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						agt Ser						-			-	864
	_					cat His 295	_	_	_				-			912
		_	_	_		agg Arg										960
						ggg Gly										1008
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					cga Arg											. 1536
					caa Gln											1584
					aat Asn ,											1632
					caa Gln 550											1680
					ttt Phe											1728
					agt Ser											1776

•			_	_		ata Ile	_	-		_	_			•		1824
_			_			tat Tyr 615										1872
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						caa Gln						-	_			1968
						gaa Glu										2016
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Asp Gly	/ Glu	Lys 820	Cys	Ala	His	His	Ser 825	His	His	Phe	Ser	Leu 830	Asp	Ile	
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ttt cto Phe Lei 865	_					_		_			_	-			2640
aga gcg Arg Ala	_										_	-		_	2688
aca aat Thr Ası															2736
gta aad Val Ası															2784
att cas Ile His 930	s Ala				-	-		_		-	-	-		-	2832
cct gag Pro Gli 945													_	_	2880
tta gaa Leu Gli		-				_					_	~ ~	_		2928
gtc att											-				2976
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gtt gtt Val Val 10:	l Pr	g gaa o Glu				a Gl				ln G1					3069
tgt ccg Cys Pro 102	G1;	t cgt y Arq				e Le				ır Al			aag ( Lys (		3114
gga tau Gly Tyr 104	c Gl	a gaa y Glu		_	_	L Tł			_	lu Il	_		aac a Asn <i>P</i>		3159

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Glu '						act Thr 1090									3294
Ala 1						gat Asp 1105									3339
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Gly '						cca Pro 1135									3429
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Ser A	Asn I	Pro (	Glu V	/al (	Glu V	/al Le	eu Gl	.y G]	y Gl	u Ar	g Ile	e Glu	. Thr	Gly	

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile

Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser

40

35

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile 70 75 Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu 105 Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala 135 Ile Pro Leu Phe Ala Val Gln Asn Tyr Gln Val Pro Leu Leu Ser Val 150 155 Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 185 Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val 200 195 Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 215 Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro 250 Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 265 Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu · 275 280 Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 295 Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315 Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 345 Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 360 355

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- Thr Leu Pro Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln
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- Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu 930 935 940
- Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu 945 950 955 960
- Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn 965 970 975
- Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val

980 985 990

Lys	Gly	His V 995	Val i	Asp '	Val (		lu (	Gln .	Asn .	Asn (		Arg :	Ser '	Val	Leu		
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Ala	Pro 1100		Val	Pro	Ala	Asp 1105	_	Ala	Ser	Val	Tyr 1110	Glu O	Glu	Lys			ı
Ser	Tyr 1115		Asp	Gly	Arg	Arg 1120		Asn	Pro	Cys	Glu 1125	Phe	Asn	Arg			
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<213> Artificial

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Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser 35 40 45

Glu Phe Val Pro Gly Ala Gly Phe Val Leu Gly Leu Val Asp Ile Ile 50 55 60

Trp Gly Ile Phe Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile 65 70 75 80

Glu Gln Leu Ile Asn Gln Arg Ile Glu Glu Phe Ala Arg Asn Gln Ala 85 90 95

Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr Gln Ile Tyr Ala Glu . 100 105 110

Ser Phe Arg Glu Trp Glu Ala Asp Pro Thr Asn Pro Ala Leu Arg Glu 115  $\cdot$  120 125

Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser Ala Leu Thr Thr Ala 130 135 140

Tyr Val Gln Ala Ala Asn Leu His Leu Ser Val Leu Arg Asp Val Ser 165 170 175

Val Phe Gly Gln Arg Trp Gly Phe Asp Ala Ala Thr Ile Asn Ser Arg 180 185 190

Tyr Asn Asp Leu Thr Arg Leu Ile Gly Asn Tyr Thr Asp Tyr Ala Val 195 200 205

Arg Trp Tyr Asn Thr Gly Leu Glu Arg Val Trp Gly Pro Asp Ser Arg 210 215 220

Asp Trp Val Arg Tyr Asn Gln Phe Arg Arg Glu Leu Thr Leu Thr Val 225 230 235 240

Leu Asp Ile Val Ala Leu Phe Pro Asn Tyr Asp Ser Arg Arg Tyr Pro
245 250 255

Ile Arg Thr Val Ser Gln Leu Thr Arg Glu Ile Tyr Thr Asn Pro Val 260 265 270

- Leu Glu Asn Phe Asp Gly Ser Phe Arg Gly Ser Ala Gln Gly Ile Glu 275 280 285
- Arg Ser Ile Arg Ser Pro His Leu Met Asp Ile Leu Asn Ser Ile Thr 290 295 300
- Ile Tyr Thr Asp Ala His Arg Gly Tyr Tyr Tyr Trp Ser Gly His Gln 305 310 315
- Ile Met Ala Ser Pro Val Gly Phe Ser Gly Pro Glu Phe Thr Phe Pro 325 330 335
- Leu Tyr Gly Thr Met Gly Asn Ala Ala Pro Gln Gln Arg Ile Val Ala 340 345 350
- Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365
- Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp 370 375 380
- Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val 385 390 395 400
- Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln 405 410 415
- Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His 420 425 430
- Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445
- Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Thr Leu Thr Asn 450 455 460
- Thr Ile Asp Pro Glu Arg Ile Asn Gln Ile Pro Leu Val Lys Gly Phe 465 470 475 480
- Arg Val Trp Gly Gly Thr Ser Val Ile Thr Gly Pro Gly Phe Thr Gly 485 490 495
- Gly Asp Ile Leu Arg Arg Asn Thr Phe Gly Asp Phe Val Ser Leu Gln 500 510
- Val Asn Ile Asn Ser Pro Ile Thr Gln Arg Tyr Arg Leu Arg Phe Arg 515 520 525
- Tyr Ala Ser Ser Arg Asp Ala Arg Val Ile Val Leu Thr Gly Ala Ala 530 540
- Ser Thr Gly Val Gly Gln Val Ser Val Asn Met Pro Leu Gln Lys 545 550 555 560
- Thr Met Glu Ile Gly Glu Asn Leu Thr Ser Arg Thr Phe Arg Tyr Thr 565 570 . 575

Asp	Pne	Ser	Asn	Pro	Phe	Ser	Phe	Arg	Ala	Asn	Pro	Asp	Ile	Ile	Gly
			580					585					590		

- Ile Ser Glu Gln Pro Leu Phe Gly Ala Gly Ser Ile Ser Ser Gly Glu 595 600 605
- Leu Tyr Ile Asp Lys Ile Glu Ile Ile Leu Ala Asp Ala Thr Phe Glu 610 615 620
- Ala Glu Ser Asp Leu Glu Arg Ala Gln Lys Ala Val Asn Ala Leu Phe 625 630 635 640
- Thr Ser Ser Asn Gln Ile Gly Leu Lys Thr Asp Val Thr Asp Tyr His
  645 650 655
- Ile Asp Gln Val Ser Asn Leu Val Asp Cys Leu Ser Asp Glu Phe Cys 660 665 670
- Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys His Ala Lys Arg 675 680 685
- Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Arg Gly Ile 690 695 700
- Asn Arg Gln Pro Asp Arg Gly Trp Arg Gly Ser Thr Asp Ile Thr Ile 705 710 715 720
- Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val Thr Leu Pro Gly 725 730 735
- Thr Val Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu 740 745 750
- Ser Lys Leu Lys Ala Tyr Thr Arg Tyr Glu Leu Arg Gly Tyr Ile Glu 755 760 765
- Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala Lys His 770 780
- Glu Ile Val Asn Val Pro Gly Thr Gly Ser Leu Trp Pro Leu Ser Ala 785 790 795 800
- Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg Cys Ala Pro His 805 810 815
- Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly Glu Lys 820 825 830
- Cys Ala His His Ser His His Phe Thr Leu Asp Ile Asp Val Gly Cys 835 840 845
- Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile Phe Lys Ile Lys 850 855 860
- Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu Phe Leu Glu Glu 865 870 875 880
- Lys Pro Leu Leu Gly Glu Ala Leu Ala Arg Val Lys Arg Ala Glu Lys

885 890 895

Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Asn Ile Val 900 905 910

- Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe Val Asn Ser Gln 915 920 925
- Tyr Asp Arg Leu Gln Val Asp Thr Asn Ile Ala Met Ile His Ala Ala 930 935 940
- Asp Lys Arg Val His Arg Ile Arg Glu Ala Tyr Leu Pro Glu Leu Ser 945 950 . 955 960
- Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu Leu Glu Gly Arg 965 970 975
- Ile Phe Thr Ala Tyr Ser Leu Tyr Asp Ala Arg Asn Val Ile Lys Asn 980 985 990
- Gly Asp Phe Asn Asn Gly Leu Leu Cys Trp Asn Val Lys Gly His Val 995 1000 1005
- Asp Val Glu Glu Gln Asn Asn His Arg Ser Val Leu Val Ile Pro 1010 1015 1020
- Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val Cys Pro Gly 1025 1030 1035
- Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu Gly Tyr Gly 1040 1045 1050
- Glu Gly Cys Val Thr Ile His Glu Ile Glu Asp Asn Thr Asp Glu 1055 1060 1065
- Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Val Tyr Pro Asn Asn 1070 1075 1080
- Thr Val Thr Cys Asn Asn Tyr Thr Gly Thr Gln Glu Glu Tyr Glu 1085 1090 1095
- Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr Asp Glu Ala Tyr Gly 1100 1105 1110
- Asn Asn Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu 1115 1120 1125
- Lys Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Ser Asn 1130 1135 1140
- Arg Gly Tyr Gly Asp Tyr Thr Pro Leu Pro Ala Gly Tyr Val Thr 1145 1150 1155
- Lys Asp Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu 1160 1165 1170
- Ile Gly Glu Thr Glu Gly Thr Phe Ile Val Asp Ser Val Glu Leu 1175 1180 1185

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Legeta	cgc aatttctttt ga	igigaalii	gtteeeggtg	ciggattigt	gttaggacta	180							
attasts	ıtaa tatggggaat tt	ttaataaa	tataaataaa	acccatttct	tatagàaatt	240							
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	Jagoaccaag ag	,	-5-account	Journal	gaacagcycc	440							
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	J : : :: : : : : : : : : : : : : : : :	5 5 - 0			- Joan Jung Cu	400							
tatgtto	aag ctgcaaattt ac	atttatca	gttttgagag	atgtttcagt	gtttggacaa	540							

aggtggggat ttgatgccgc gactatcaat agtcgttata atgatttaac taggcttatt 600

Leu Leu Met Glu Glu

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Met Asp Asn Asn Pro Asn Ile Asn Glu Cys Ile Pro Tyr Asn Cys Leu

1 10 15

Ser Asn Pro Glu Val Glu Val Leu Gly Gly Glu Arg Ile Glu Thr Gly 20 25 30

Tyr Thr Pro Ile Asp Ile Ser Leu Ser Leu Thr Gln Phe Leu Leu Ser

<sup>&</sup>lt;210> 34

<sup>&</sup>lt;211> 1177

<sup>&</sup>lt;212> PRT

<sup>&</sup>lt;213> Artificial

<sup>&</sup>lt;220>

<sup>&</sup>lt;223> Hybrid Delta-Endotoxin

<sup>&</sup>lt;400> 34

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Trp 65	Gly	Ile	Phe	Gly	Pro 70	Ser	Gln	Trp	Asp	Ala 75	Phe	Leu	Val	Gln	Ile 80
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Ile	Ser	Arg	Leu 100	Glu	Gly	Leu	Ser	Asn 105	Leu	Tyr	Gln	Ile	Туг 110	Ala	·Gli
Ser	Phe	Arg 115	Glu	Trp	Glu	Ala	Asp 120	Pro	Thr	Asn	Pro	Ala 125	Leu	Arg	Glı
Glu	Met 130	Arg	Ile	Gln	Phe	Asn 135	Asp	Met	Asn	Ser	Ala 140	Leu	Thr	Thr	Ala
Ile 145	Pro	Leu	Phe	Ala	Val 150	Gln	Asn	Tyr	Gln	Val 155	Pro	Leu	Leu	Ser	Va]
Tyr	Val	Gln	Ala	Ala 165	Asn	Leu	His	Leu	Ser 170	Val	Leu	Arg	Asp	Val 175	Ser
Val	Phe	Gly	Gln 180	Arg	Trp	Gly	Phe	Asp 185	Ala	Ala	Thr	Ile	Asn 190	Ser	Arg
Tyr	Asn	Asp 195	Leu	Thr	Arg	Leu	Ile 200	Gly	Asn	Tyr	Thr	Asp 205	Tyr	Ala	Va]
Arg	Trp 210	Tyr .	Asn	Thr	Gly	Leu 215	Glu	Arg	Val	Trp	Gly 220	Pro	Asp	Ser	Arg
Asp 225	Trp	Val	Arg	Tyr	Asn 230	Gln	Phe	Arg	Arg	Glu 235	Leu	Thr	Leu	Thr	Val 240
Leu	Asp	Ile	Val	Ala 245	Leu	Phe	Pro	Asn	Tyr 250	Asp	Ser	Arg	Arg	Tyr 255	Pro
Ile	Arg	Thr	Val 260	Ser	Gln	Leu	Thr	Arg 265	Glu	Ile	Tyr	Thr	Asn 270	Pro	Va]
Leu	Glu	Asn 275	Phe	Asp	Gly	Ser	Phe 280	Arg	Gly	Ser	Ala	Gln 285	Gly	Ile	Glu
Arg	Ser 290	Ile	Arg	Ser	Pro	His 295	Leu	Met	Asp	Ile	Leu 300	Asn	Ser	Ile	Thr
Ile 305	Tyr	Thr	Asp	Ala	His 310	Arg	Gly	Tyr	Tyr	Tyr 315	Trp	Ser	Gly	His	Gln 320
Ile	Met	Ala	Ser	Pro 325	Val	Gly	Phe	Ser	Gly 330	Pro	Glu	Phe	Thr	Phe 335	Pro
Leu	Tyr	Gly	Thr 340	Met	Gly	Asn	Ala	Ala 345	Pro	Gln	Gln	Arg	Ile 350	Val	Ala

Gln Leu Gly Gln Gly Val Tyr Arg Thr Leu Ser Ser Thr Leu Tyr Arg 355 360 365

Arg Pro Phe Asn Ile Gly Ile Asn Asn Gln Gln Leu Ser Val Leu Asp 370 375 380

Gly Thr Glu Phe Ala Tyr Gly Thr Ser Ser Asn Leu Pro Ser Ala Val 385 390 395 400

Tyr Arg Lys Ser Gly Thr Val Asp Ser Leu Asp Glu Ile Pro Pro Gln
405 410 415

Asn Asn Val Pro Pro Arg Gln Gly Phe Ser His Arg Leu Ser His
420 425 430

Val Ser Met Phe Arg Ser Gly Phe Ser Asn Ser Ser Val Ser Ile Ile 435 440 445

Arg Ala Pro Met Phe Ser Trp Ile His Arg Ser Ala Glu Phe Asn Asn 450 455 460

Ile Ile Ala Ser Asp Ser Ile Thr Gln Ile Pro Leu Val Lys Ala His 465 470 475 480

Thr Leu Gln Ser Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly
485 490 495

Gly Asp Ile Leu Arg Arg Thr Ser Gly Gly Pro Phe Ala Tyr Thr Ile 500 505 510

Val Asn Ile Asn Gly Gln Leu Pro Gln Arg Tyr Arg Ala Arg Ile Arg 515 520 525

Tyr Ala Ser Thr Thr Asn Leu Arg Ile Tyr Val Thr Val Ala Gly Glu 530 540

Arg Ile Phe Ala Gly Gln Phe Asn Lys Thr Met Asp Thr Gly Asp Pro 545 550 555 560

Leu Thr Phe Gln Ser Phe Ser Tyr Ala Thr Ile Asn Thr Ala Phe Thr 565 570 575

Phe Pro Met Ser Gln Ser Ser Phe Thr Val Gly Ala Asp Thr Phe Ser 580 585 590

Ser Gly Asn Glu Val Tyr Ile Asp Arg Phe Glu Leu Ile Pro Val Thr 595 600 605

Ala Thr Leu Glu Ala Glu Tyr Asn Leu Glu Arg Ala Gln Lys Ala Val 610 615 620

Asn Ala Leu Phe Thr Ser Thr Asn Gln Leu Gly Leu Lys Thr Asn Val 625 630 635 640

Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu Val Thr Tyr Leu Ser 645 650 655

- Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu Ser Glu Lys Val Lys 660 665 670
- His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Ser Asn 675 680 685
- Phe Lys Asp Ile Asn Arg Gln Pro Glu Arg Gly Trp Gly Gly Ser Thr 690 695 700
- Gly Ile Thr Ile Gln Gly Gly Asp Asp Val Phe Lys Glu Asn Tyr Val 705 710 715 720
- Thr Leu Ser Gly Thr Phe Asp Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln
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- Lys Ile Asp Glu Ser Lys Leu Lys Ala Phe Thr Arg Tyr Gln Leu Arg
  740 745 750
- Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr
  755 760 765
- Asn Ala Lys His Glu Thr Val Asn Val Pro Gly Thr Gly Ser Leu Trp
  770 780
- Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys Gly Glu Pro Asn Arg 785 790 795 800
- Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg 805 810 815
- Asp Gly Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile 820 825 830
- Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu Gly Val Trp Val Ile 835 840 845
- Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg Leu Gly Asn Leu Glu 850 855 860
- Phe Leu Glu Glu Lys Pro Leu Val Gly Glu Ala Leu Ala Arg Val Lys 865 870 875 880
- Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Glu Trp Glu 885 890 895
- Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser Val Asp Ala Leu Phe 900 905 910
- Val Asn Ser Gln Tyr Asp Gln Leu Gln Ala Asp Thr Asn Ile Ala Met 915 920 925
- Ile His Ala Ala Asp Lys Arg Val His Ser Ile Arg Glu Ala Tyr Leu 930 935 940
- Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala Ala Ile Phe Glu Glu 945 950 955 960
- Leu Glu Gly Arg Ile Phe Thr Ala Phe Ser Leu Tyr Asp Ala Arg Asn

965 970 975

Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu Ser Cys Trp Asn Val 980 985 990

- Lys Gly His Val Asp Val Glu Glu Gln Asn Asn Gln Arg Ser Val Leu
  995 1000 1005
- Val Val Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val 1010 1015 1020
- Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu 1025 1030 1035
- Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn 1040 1045 1050
- Thr Asp Glu Leu Lys Phe Ser Asn Cys Val Glu Glu Glu Ile Tyr 1055 1060 1065
- Pro Asn Asn Thr Val Thr Cys Asn Asp Tyr Thr Val Asn Gln Glu 1070 1075 1080
- Glu Tyr Gly Gly Ala Tyr Thr Ser Arg Asn Arg Gly Tyr Asn Glu 1085 1090 1095 .
- Ala Pro Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys 1100 1105 1110
- Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys Glu Phe Asn Arg 1115 1120 1125
- Gly Tyr Arg Asp Tyr Thr Pro Leu Pro Val Gly Tyr Val Thr Lys 1130 1135 1140
- Glu Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile Glu Ile 1145 1150 1155
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Leu Met Glu Glu 1175

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<212> DNA

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